

# CLAIM AMENDMENTS

1. (Currently Amended) A via-filling material ~~filled in~~ filling a via hole ~~previously~~ when a trench, wider than ~~said the~~ via hole, is formed by ~~conducting~~ plasma etching ~~in via hole part in~~ an insulating film including the via hole, wherein said via-filling material ~~comprises~~ comprising a polymer containing a ~~repeat~~ repeating unit represented by the following formula (1):



~~in which~~ wherein

R<sub>1</sub> is a member selected from the group consisting of hydrogen ~~atom~~, fluorine ~~atom~~, chlorine ~~atom~~, bromine ~~atom~~, and methyl group;

R<sub>2</sub> is a member selected from the group consisting of hydrogen ~~atom~~, a C<sub>1-3</sub> alkyl group, and a C<sub>1-4</sub> alkyl group in which the hydrogen ~~atom~~ is ~~substituted~~ replaced by at least one ~~kind of atoms~~ of fluorine, chlorine, and bromine ~~atom~~; and

X is -C(=O)O- or -S(=O)<sub>2</sub>O-.

2. (Original) The via-filling material of Claim 1, wherein said polymer has a weight average molecular weight of 1,000 to 200,000.

3. (Currently Amended) A via-filling material ~~filled in~~ filling a via hole ~~previously~~ when a trench, wider than ~~said the~~ via hole, is formed by ~~conducting~~ plasma etching ~~in via hole part in~~ an insulating film including the via hole, wherein said via-filling material ~~comprises~~ comprising a copolymer of a first monomer and a second monomer containing an unsaturated group which brings about a copolymerization reaction with said first monomer and a functional group capable of crosslinking the copolymer, ~~and~~ wherein said first monomer ~~being~~ is represented by the formula (2):



~~in which~~

R<sub>1</sub> is a member selected from the group consisting of hydrogen ~~atom~~, fluorine ~~atom~~, chlorine ~~atom~~, bromine ~~atom~~, and methyl group;

R<sub>2</sub> is a member selected from the group consisting of hydrogen ~~atom~~, a C<sub>1-3</sub> alkyl group, and a C<sub>1-4</sub> alkyl group in which the hydrogen ~~atom~~ is ~~substituted~~ replaced by at least one ~~kind of atom~~ of fluorine, chlorine, and bromine ~~atom~~; and

X is -C(=O)O- or -S(=O)<sub>2</sub>O-.

4. (Currently Amended) The via-filling material of Claim 3, wherein said functional group capable of crosslinking the copolymer is an unsaturated group.

5. (Currently Amended) The via-filling material of Claim 3, wherein said functional group capable of crosslinking the copolymer is an epoxy group.

6. (Original) A via-filling material comprising a mixture of the copolymer of Claim 4 and an unsaturated compound containing at least two unsaturated groups.

7. (Original) A via-filling material comprising a mixture of the copolymer of Claim 5 and an epoxy compound containing at least two epoxy groups.

8. (Currently Amended) A via-filling material ~~filled in filling~~ a via hole ~~previously~~ when a trench, wider than ~~said the~~ via hole, is formed by ~~conducting~~ plasma etching ~~in via hole part in an~~ insulating film including the via hole, ~~wherein~~ said via-filling material ~~comprises~~ comprising a mixture ~~obtained by mixing of~~ a compound selected from melamine compounds containing at least two methoxymethyl groups, urea compounds containing at least two methoxymethyl groups, and epoxy compounds containing at least two epoxy groups ~~to, with~~ a copolymer of a first monomer and a second monomer, wherein

said second monomer is an unsaturated compound containing a functional group selected from hydroxyl group, carboxyl group, and dicarboxylic anhydride group, and ~~wherein~~

said first monomer is represented by ~~the formula (2):~~



~~in which~~

R<sub>1</sub> is a member selected from the group consisting of hydrogen ~~atom~~, fluorine ~~atom~~, chlorine ~~atom~~, bromine ~~atom~~, and methyl group;

R<sub>2</sub> is a member selected from the group consisting of hydrogen ~~atom~~, a C<sub>1-3</sub> alkyl group, and a C<sub>1-4</sub> alkyl group in which the hydrogen ~~atom~~ is ~~substituted~~ replaced by at least one ~~kind of atoms~~ of fluorine, chlorine, and bromine ~~atom~~; and

X is -C(=O)O- or -S(=O)<sub>2</sub>O-.

9. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of~~ comprising:

forming a stopper film on ~~the surface of~~ a lower insulating film on which a first conductor is ~~formed present and laminating~~ depositing an upper insulating film, ~~interposing so that said stopper film is interposed between said lower and upper insulating films;~~

forming a via hole leading from ~~the surface of~~ said upper insulating film to ~~the surface of~~ said stopper film ~~at the position where~~ opposite said first conductor is ~~located below;~~

applying ~~the a film of said~~ via-filling material of Claim 1 ~~on the surface of~~ to said upper insulating film ~~to fill and filling~~ said via hole with said via-filling material;

solidifying said via-filling material;

forming a resist pattern defining an opening part, including said via hole, on the ~~applied film made of a via filling body obtained by solidifying~~ said via-filling material;

forming a trench ~~of a depth which~~ that does not reach said stopper film in said upper insulating film by dry etching said upper insulating film and said via-filling ~~body material,~~ using said resist pattern as a mask;

removing said resist pattern, ~~the film of said applied film made of~~ via-filling ~~body material,~~ and said via-filling ~~body material~~ remaining in said via hole ~~and;~~

etching said stopper film ~~appeared on the bottom of~~ exposed in said via hole, thereby exposing said first conductor; and

forming a second conductor in said trench and in said via hole.

10. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of~~ comprising:

forming an insulating film on a substrate;

forming a via hole in said insulating film;

applying ~~the a film of said~~ via-filling material of Claim 1 ~~on the surface of~~ said insulating film ~~to fill and filling~~ said via hole with said via-filling material;

solidifying said via-filling material;

forming a resist pattern defining an opening part, including said via hole, on the ~~applied film made of a via-filling body obtained by solidifying~~ said via-filling material;  
forming a trench ~~of a depth which~~ that does not reach said substrate in said insulating film by dry etching said insulating film and said via-filling ~~body material~~, using said resist pattern as a mask;  
removing said resist pattern, ~~applied the film made of~~ said via-filling ~~body material~~, and said via-filling ~~body material~~ remaining in said via hole; and  
forming a conductor in said trench and in said via hole.

11. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of comprising:~~

forming a stopper film on ~~the surface of~~ a lower insulating film on which a first conductor is ~~formed present and laminating~~ depositing an upper insulating film, ~~interposing so that~~ said stopper film is interposed between said lower and upper insulating films;  
forming a via hole leading from ~~the surface of~~ said upper insulating film to ~~the surface of~~ said stopper film ~~at the position where~~ opposite said first conductor ~~is located below;~~  
applying ~~the a film of~~ said via-filling material of Claim 3 ~~on the surface of to~~ said upper insulating film ~~to fill and filling~~ said via hole with said via-filling material;  
solidifying said via-filling material;  
forming a resist pattern defining an opening part, including said via hole, on the ~~applied film made of a via-filling body obtained by solidifying~~ said via-filling material;  
forming a trench ~~of a depth which~~ that does not reach said stopper film in said upper insulating film by dry etching said upper insulating film and said via-filling ~~body material~~, using said resist pattern as a mask;  
removing said resist pattern, ~~the film of~~ said ~~applied film made of~~ via-filling ~~body material~~, and said via-filling ~~body material~~ remaining in said via hole ~~and;~~  
etching said stopper film ~~appeared on the bottom of~~ exposed in said via hole, thereby exposing said first conductor; and  
forming a second conductor in said trench and in said via hole.

12. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of comprising:~~

forming an insulating film on a substrate;  
forming a via hole in said insulating film;  
applying ~~the a film of~~ said via-filling material of Claim 3 ~~on the surface of~~ said insulating film ~~to fill and filling~~ said via hole with said via-filling material;  
solidifying said via-filling material;

forming a resist pattern defining an opening part, including said via hole, on the ~~applied film made of a via-filling body obtained by solidifying~~ said via-filling material;

forming a trench ~~of a depth which~~ that does not reach said substrate in said insulating film by dry etching said insulating film and said via-filling ~~body material~~, using said resist pattern as a mask;

removing said resist pattern, ~~applied the film made of said~~ via-filling body material, and said via-filling body material remaining in said via hole; and

forming a conductor in said trench and in said via hole.

13. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of~~ comprising:

forming a stopper film on ~~the surface of~~ a lower insulating film on which a first conductor is ~~formed present and laminating~~ depositing an upper insulating film, interposing so that said stopper film is interposed between said lower and upper insulating films;

forming a via hole leading from ~~the surface of~~ said upper insulating film to ~~the surface of~~ said stopper film ~~at the position where~~ opposite said first conductor ~~is located below~~;

applying ~~the~~ a film of said via-filling material of Claim 8 ~~on the surface of~~ to said upper insulating film ~~to fill~~ and filling said via hole with said via-filling material;

solidifying said via-filling material;

forming a resist pattern defining an opening part, including said via hole, on the ~~applied film made of a via-filling body obtained by solidifying~~ said via-filling material;

forming a trench ~~of a depth which~~ that does not reach said stopper film in said upper insulating film by dry etching said upper insulating film and said via-filling ~~body material~~, using said resist pattern as a mask;

removing said resist pattern, ~~the film of said~~ ~~applied film made of~~ via-filling body material, and said via-filling ~~body material~~ remaining in said via hole ~~and~~;

etching said stopper film ~~appeared on the bottom of~~ exposed in said via hole, thereby exposing said first conductor; and

forming a second conductor in said trench and in said via hole.

14. (Currently Amended) A process for fabricating a semiconductor integrated circuit, ~~which comprises the steps of~~ comprising:

forming an insulating film on a substrate;

forming a via hole in said insulating film;

applying ~~the~~ a film of said via-filling material of Claim 8 ~~on the surface of~~ said insulating film ~~to fill~~ and filling said via hole with said via-filling material;

solidifying said via-filling material;

forming a resist pattern defining an opening part, including said via hole, on the applied film ~~made of a via-filling body obtained by solidifying~~ said via-filling material;

forming a trench ~~of a depth which~~ that does not reach said substrate in said insulating film by dry etching said insulating film and said via-filling ~~body~~ material, using said resist pattern as a mask;

removing said resist pattern, ~~applied the film made of~~ said via-filling ~~body~~ material, and said via-filling ~~body~~ material remaining in said via hole; and

forming a conductor in said trench and in said via hole.